

Claims

1. A rotary work lifter characterized in a rotary work lifter having a drive source an operation of which is controlled by a drive source control portion, driven by the drive source and enabling to carry a work mounted on a working table, said rotary work lifter comprising:

position detecting means for detecting a rotational position of the rotary work lifter;

a position determining portion for determining whether the rotary work lifter reaches a predetermined position by position information detected by the position detecting means;

speed detecting means for detecting a rotational speed of the rotary work lifter; and

a speed determining portion for outputting a signal of stopping the rotary work lifter to the drive source control portion when a speed of the rotary work lifter becomes equal to or smaller than a predetermined speed by speed information detected by the speed detecting means.

2. The rotary work lifter according to Claim 1, characterized in that the position determining portion determines whether the rotary work lifter is disposed in either range of a first rotational range in which the rotary work lifter does not lift the work and a second rotational range in which the rotary work

lifter lifts the work;

wherein the speed determining portion determines a first speed as the predetermined speed when the rotary work lifter is disposed in the first rotational range and determines a second speed as the predetermined speed when the rotary work lifter is disposed in the second rotational range to thereby individually set the first speed and the second speed.

3. The rotary work lifter according to Claim 2, characterized in that the first speed is set at the speed faster than the second speed.

4. A rotary work lifter characterized in a rotary work lifter having a drive source an operation of which is controlled by a drive source control portion, driven by the drive source and enabling to carry a work mounted on a working table, said rotary work lifter comprising:

position detecting means for detecting a rotational position of the rotary work lifter;

20 a position determining portion for determining whether the rotary work lifter reaches a predetermined position by position information detected by the position detecting means;

load detecting means for detecting a load of a rotational operation of the rotary work lifter; and

25 a load determining portion for outputting a signal of

stopping the rotary work lifter to the drive source control portion when the load of the rotational operation of the rotary work lifter becomes equal to or larger than a predetermined load by load information detected by the load detecting means.

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5. The rotational work lifter according to Claim 4, characterized in that the position determining portion determines whether the rotary work lifter is disposed either range of a first rotational range in which the work is not lifted and a second rotational range in which the work is lifted;

10 wherein the load determining portion determines a first load as the predetermined load when the rotary work lifter is disposed in the first rotational range and determines a second load as the predetermined load when the rotational work lifter is disposed in the second rotational range to thereby individually set the first load and the second load.

6. The rotary work lifter according to Claim 5, characterized in that the first load is set to a load smaller than the second load.

7. The rotary work lifter according to any one of Claim 1 through Claim 6, characterized in that the position detecting means comprises:

25 a proximity sensor dog attached to a rotating shaft of

the drive source or other rotating shaft rotated in synchronism with the rotating shaft of the drive source; and

a proximity sensor fixed to a position proximate to the proximity sensor dog when the rotary shaft is rotated by a
5 predetermined angle around the rotating shaft attached with the proximity sensor dog.

8. The rotary work lifter according to any one of Claim 1 through Claim 6, characterized in that the position detecting
10 means comprises:

a light chopper attached to a rotating shaft of the drive source or other rotating shaft rotated in synchronism with the rotating shaft of the drive source;

a photo sensor for detecting light transmitted or blocked
15 by the light chopper; and

a counter for counting a pulse outputted from the photo sensor by rotating the light chopper.

9. The rotary work lifter according to any one of Claim 1
20 through Claim 6, characterized in that the position detecting means comprises:

an encoder attached to a rotating shaft of the drive source or other rotating shaft rotated in synchronism with the rotating shaft of the drive source; and

25 a counter counting a pulse outputted from the encoder

by rotating the encoder.

10. The rotary work lifter according to any one of Claim 1
through Claim 3, characterized in that the speed detecting means
5 comprises:

a light chopper attached to a rotating shaft of the drive
source or other rotating shaft rotated in synchronism with the
rotating shaft of the drive source;

a photo sensor for detecting light transmitted or blocked
10 by the light chopper; and

a pulse period measuring instrument for measuring a time
interval of a pulse outputted from the photo sensor by rotating
the light chopper.

15 11. The rotary work lifter according to any one of Claim 1
through Claim 3, characterized in that the speed detecting means
comprises:

an encoder attached to a rotating shaft of the drive source
or other rotating shaft rotated in synchronism with the rotating
20 shaft of the drive source; and

a pulse period measuring instrument for measuring a time
interval of a pulse outputted from the encoder by rotating the
encoder.

25 12. The rotary work lifter according to any one of Claim 1

through Claim 3, characterized in that the speed detecting means comprises:

a proximity sensor dog attached to a rotating shaft of the drive source or other rotating shaft rotated in synchronism
5 with the rotating shaft of the drive source; and

proximity sensors arranged at equal intervals on a circumference proximate to the proximity sensor dog when the rotating shaft is rotated around a rotating shaft attached with the proximity sensor dog.

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13. The rotary work lifter according to any one of Claim 4 through Claim 6, characterized in that the load detecting means is a torque sensor attached to a rotating shaft of the drive source or other rotating shafts rotated in synchronism with
15 the rotating shaft of the drive source.

14. The rotary work lifter according to any one of Claim 4 through Claim 6, characterized in that when the drive source constitutes a power source by a fluid pressure, the load
20 detecting means is a pressure meter for measuring a pressure of the fluid.

15. The rotary work lifter according to any one of Claim 4 through Claim 6, characterized in that when the drive source
25 constitutes a power source by electricity, the load detecting

means is an ammeter for measuring a current flowing at the drive source.

16. The rotary work lifter according to any one of Claim 1
5 through Claim 6, characterized in that when the rotary work
lifter is stopped by a stop signal outputted from the speed
determining portion or the load determining portion, the drive
source control portion rotates the rotary work lifter in a
rotational direction reverse to a rotational direction before
10 stopping the rotary work lifter by a predetermined time period
or a predetermined angle, rotates the rotary work lifter again
in the original rotational direction, and repeats the series
of operation and stops the rotary work lifter when the series
of operation is repeated by a predetermined number of times.

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17. A working machine characterized in a working machine
including a rotary work lifter for enabling to carry a work
mounted on a working table, said working machine including the
rotary work lifter according to any one of Claim 1 through Claim
20 6.